

Roadmap to a Square Kilometer Array

Memo from Simon Swordy

5/10/2005

Thanks to Rene for pushing on the organizers to provide the discussion which ended the meeting in Paris. This Paris meeting was actually much better for VERITAS than I had initially thought it might be, and I'm beginning to be convinced that we (i.e. USA) should initiate the next move in ground-based gamma-ray telescopes. As others have mentioned:

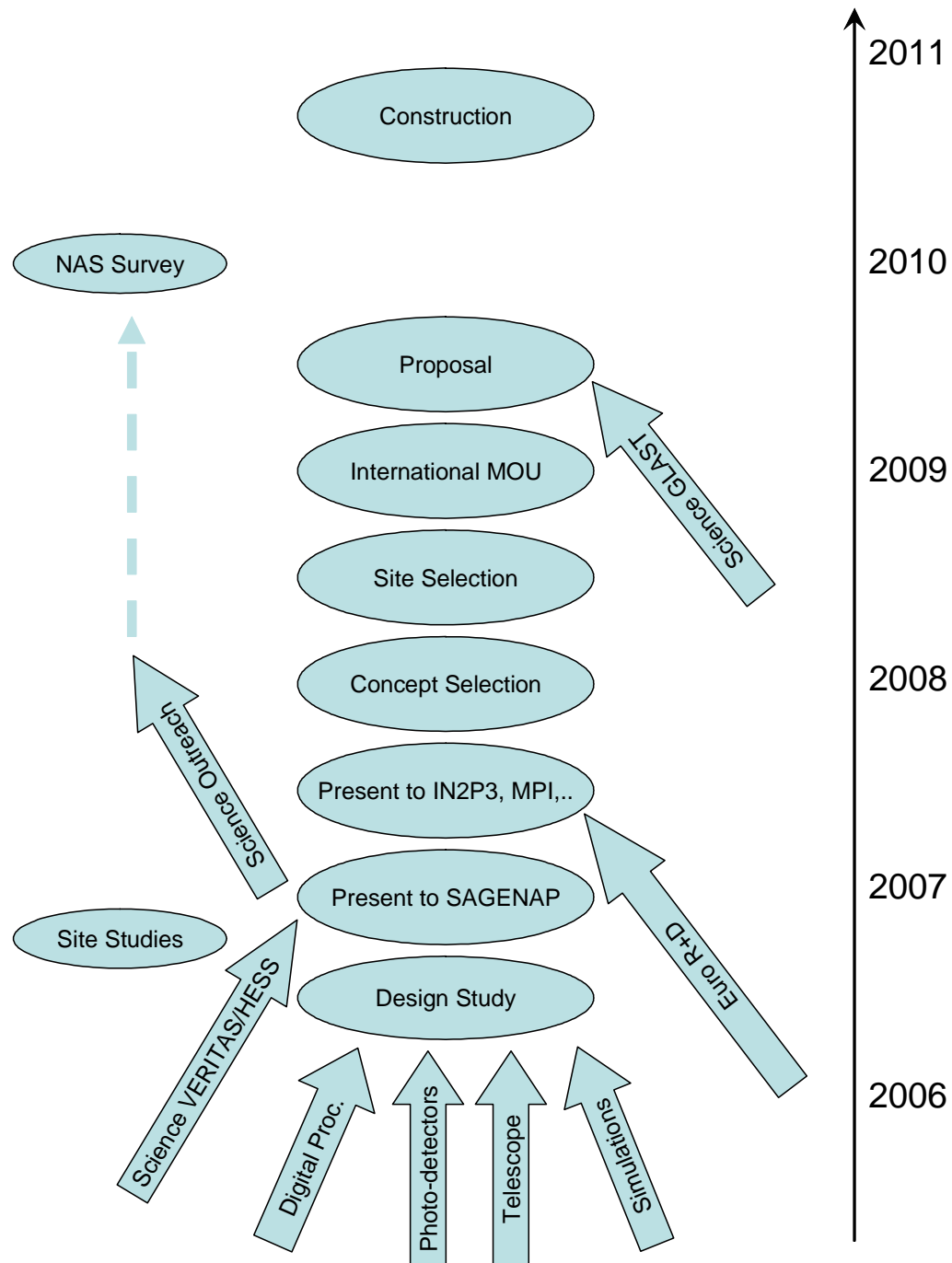
- All the present generation observatories will be adding telescopes at their site, probably through 2008 – this will be a local agenda
- The future will cost on order of \$100M
- We need a roadmap now as to how to reach that future, even though the science case is not iron-clad yet.

So this memo is really a first attempt on defining that roadmap and some thoughts on the motivations here. Obviously this will need refining but we need to start somewhere.

Observations and Motivations (some new, some stolen from others)

- The future is a big array – I am maybe prejudiced but I do not believe that getting energy thresholds much below 30GeV is realistically possible and so the only way to increase count rate from weak sources is to increase detection area beyond the light pool size. This means going from 10^5 to 10^6 m^2 by developing a square kilometer array.
- The future must be cosmological – We need to get to $z=1+$ to be taken seriously by the astronomy/cosmology community. Their interest will be a pre-requisite for getting the kind of money we'll need. This means an energy threshold below 50GeV.
- The results already emerging from HESS and those in the future from VERITAS (and GLAST) will get us taken much more seriously by the astronomy community, there could easily be discoveries of wide importance.
- We cannot justify this scientifically until results are in from the present telescopes, but we need to plan now as if this will happen.
- We (i.e. USA) cannot do this on our own. We will need ~100 PhDs to make a project like this happen - this means an international collaboration with essentially everybody at the Paris meeting. This also implies we aim to build one array of ~\$100M cost. The US end of this price-tag might be ~\$30M.
- We probably need to pick a site near the Equator (Mexico?)
- We need to get the broader scientific community supporting this to make it happen
- We need a realistic design study with costs within the next ~1 year

Road-Map to a Square Kilometer Array



Some thoughts on events and process timeline which are needed to get the Square Kilometer Array built

If you managed to get this far you're probably thinking "OK Swordy, but what's in it for me?". As a core group I believe we have all the intellectual attributes needed to make something like this happen, but naturally we are all at some level in competition – and we all have our favorite things we like to do. However we need to get real about the fact that none of us can do something of this scale without a coherent strategy where we all play a role. So whether we like it or not, we must get along and pull together on this to make it happen. We have managed to do this on VERITAS - now is the crucial time to take the initiative on the future.